

## Unveiling the key determinants of migration intention among healthcare professionals in Morocco's public health sector.

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**Abstract:**

The persistent migration of healthcare professionals poses a serious challenge to the sustainability and equity of Morocco's public healthcare system, particularly amid existing workforce shortages and regional disparities. This study aims to identify the key determinants shaping migration intentions among public healthcare professionals in Morocco. Using primary survey data collected from 355 doctors, nurses, and paramedical staff working in university and regional health centers, the analysis applies a binary Logit model to examine the influence of demographic, socio-economic, professional, and institutional factors. The findings reveal that migration intentions are significantly higher among male and mid-career professionals, those with lower income levels, and staff working in under-resourced regional health centers. Conversely, higher earnings and greater professional stability reduce the likelihood of intending to migrate. These results highlight the central role of working conditions, wages, and institutional inequalities in driving brain drain. The study provides valuable evidence to inform targeted retention policies and contributes to a more nuanced understanding of healthcare worker migration in low- and middle-income countries.

**Keywords:** Migration intention, public healthcare, brain drain, Morocco, healthcare professionals.

## Introduction

The migration of healthcare professionals has emerged as a critical challenge for health systems worldwide, particularly in low- and middle-income countries where human resources for health are already scarce. Morocco's public healthcare system is increasingly affected by this phenomenon, as the country struggles to retain medical and paramedical professionals in the face of deteriorating working conditions, limited career advancement opportunities, and relatively low wages.

While the healthcare infrastructure in Morocco addresses basic needs through hospitals and clinics, the distribution of medical and paramedical staff essential in delivering both specialized and primary care varies significantly. This disparity, particularly in remote regions, presents challenges to ensuring equitable healthcare access nationwide (Ouassou & Ismaili Idrissi, 2025). The distribution of medical professionals across Morocco reveals significant disparities between regions. According to the Ministry of Health and Social Protection, Morocco counted 15,249 medical professionals<sup>1</sup> and 38,725 paramedical professionals<sup>2</sup> in 2023 in both public and private healthcare services, with strong regional disparities in their spatial distribution. Urban regions such as Casablanca-Settat and Rabat-Salé-Kénitra host the majority of healthcare workers likely due to better infrastructure, higher population densities, and the availability of resources. These regions serve as economic and administrative centers, which provide them with advantages in recruiting and retaining medical personnel, while some regions<sup>3</sup> and remote rural areas face acute shortages, undermining equitable access to healthcare services.

Although the migration of healthcare professionals has been extensively studied, the theoretical literature remains characterized by important gaps and inconsistencies. Classical frameworks—such as push-pull theory, human capital theory, and neoclassical migration theory—emphasize wage differentials, working conditions, and career prospects as key drivers of migration. However, empirical findings on how individual characteristics interact with institutional environments remain inconclusive. In particular, prior studies report contradictory evidence

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<sup>1</sup> The distribution of medical healthcare professionals by specialty in Morocco reveals that General medicine has the largest number of professionals (3,457) which represents nearly 27% of the total medical healthcare professionals by specialty in Morocco, which aligns with the demand for primary healthcare across the country.

<sup>2</sup> The distribution of the paramedical healthcare workforce by type shows that multipurpose nurses is the most represented category with 44% of the total reflecting their role in providing care and support across healthcare services, followed by midwives (nearly 17%).

<sup>3</sup> Southern regions of *Eddakhla-Oued Eddahab*, *Guelmim-Oued Noun*, and *Laayoune-Sakia El Hamra* have far fewer healthcare professionals. While Mid-sized regions like Fès-Meknes, Marrakech-Safi, and Tangier-Tétouan-*Al Hoceima* reflect a moderate availability of medical professionals but still lag behind the larger metropolitan areas.

regarding the role of gender, age, and professional status in shaping migration intentions. While some research suggests that men are more likely to migrate, other studies find weaker or context-dependent gender effects. Similarly, the relationship between age and migration is not linear, with competing arguments that younger professionals migrate to acquire skills while mid-career professionals migrate due to stagnation or dissatisfaction.

Another underexplored theoretical dimension concerns the role of hospital structure. Most empirical studies consider healthcare professionals as a homogeneous group, without distinguishing between those working in university hospitals and those employed in regional health centers. This omission is theoretically problematic in contexts like Morocco, where institutional disparities in resources, equipment, and professional development opportunities are substantial. Addressing these gaps is necessary to refine existing migration theories by incorporating institutional heterogeneity and to better explain migration intentions within unequal healthcare systems. From a practical standpoint, the brain drain of healthcare professionals represents an urgent policy challenge for Morocco. The country reportedly loses around 600 to 700 doctors annually to international migration, further weakening an already strained healthcare system.

Data from the National Council for Human Rights indicate that approximately 14,000 Moroccan doctors were working abroad in 2023, compared to about 23,000 practicing domestically, highlighting the scale of the problem. This sustained outflow exacerbates staff shortages, increases workload pressures on remaining staff, and disproportionately affects underserved regions. At the same time, Morocco faces a broader global context marked by intensified competition for healthcare workers. The World Health Organization projected in 2022 that the global shortage of healthcare professionals could reach 18 million by 2030, with low- and middle-income countries bearing the greatest burden.

Despite government efforts to expand training capacity and reform medical education, retention remains a critical weakness. The lack of micro-level evidence on migration intentions within the public healthcare sector constitutes a major practical gap, limiting the effectiveness of workforce policies. Addressing this gap is both necessary and urgent to design targeted interventions that respond to the specific motivations of healthcare professionals rather than relying solely on aggregate supply-side solutions.

The main objective of this research is to empirically analyze the determinants of migration intentions among public healthcare professionals in Morocco. Specifically, the study aims to: (i) examine the influence of demographic characteristics, particularly gender and age, on

healthcare professionals' migration intentions; (ii) assess the role of socio-economic factors, including income and seniority, in shaping the likelihood of intending to migrate; (iii) analyze how professional status affects migration intentions; and (iv) evaluate the impact of hospital structure on the probability that healthcare professionals express an intention to migrate.

To achieve these objectives, the study relies on a survey data collected in 2022 from doctors, nurses, and paramedical staff working in two Moroccan public hospitals as case studies and applies a Logit model to estimate migration intentions and identify the relative importance of individual and institutional determinants.

Despite that this research is not representative of the whole reality of Moroccan public hospitals, it is expected to make several contributions to the theoretical literature on healthcare worker migration. First, it provides context-specific evidence from Morocco, a country that remains underrepresented in quantitative migration studies. Second, by explicitly incorporating hospital structure into the analysis, the study advances migration theory by highlighting the role of institutional environments in shaping individual migration intentions. Third, the analysis of non-linear age effects contributes to a more nuanced understanding of career-stage dynamics, helping reconcile conflicting findings in the existing literature. From a policy perspective, the study offers evidence-based insights to support healthcare workforce retention strategies in Morocco. By identifying the profiles of professionals most likely to consider migration—particularly those working in under-resourced regional health centers—the findings can inform targeted policy measures such as differentiated wage schemes, improved working conditions, and enhanced professional development opportunities. More broadly, the study contributes to ongoing policy debates on how to mitigate brain drain and strengthen the resilience, equity, and sustainability of Morocco's public healthcare system in an increasingly competitive global labor market.

The remainder of the paper is structured as follows. Section 2 reviews the relevant theoretical and empirical literature on healthcare professional migration. Section 3 presents the data, variables, and empirical methodology. Section 4 discusses the main empirical results. Section 5 discuss some relevant policy implications and recommendations aimed at improving retention and strengthening the resilience of Morocco's public healthcare system. Finally, section 6 concludes the research.

## 2. Literature Review

This section provides a comprehensive review of the literature on the migration intentions of healthcare professionals. The intention to migrate among healthcare professionals is a critical topic in global health discussions, especially in countries facing healthcare worker shortages. The review explores both theoretical frameworks and empirical studies that examine the economic, professional, and personal factors influencing the decision to migrate.

### 2.1. Theoretical frameworks of migration intentions among healthcare professionals

The theoretical foundations explaining the migration intentions of healthcare professionals are built on several key concepts, each providing a unique lens to understand the motivations and structural factors driving this phenomenon.

First, the push-pull theory (Lee, 1966) is one of the most used frameworks. It explains migration through push factors (negative conditions in the home country) and pull factors (positive conditions in the destination country). For healthcare professionals, push factors often include low wages, poor working conditions, and limited career opportunities, driving them to seek better prospects abroad. Pull factors, on the other hand, consist of higher salaries, improved working environments, and more advanced career opportunities in the destination country (Massey et al., 1993). For many healthcare workers, the appeal of well-equipped facilities and better professional development opportunities abroad serves as a strong incentive to migrate.

The human capital theory (Becker, 1962) provides another explanation. This theory views migration as an investment in one's skills and education. Healthcare professionals, who often undergo extensive and costly training, may seek to maximize their return on investment by moving to countries where their skills are better compensated and valued (Dustmann & Kirchkamp, 2002). This economic rationale is particularly relevant for highly skilled healthcare workers, such as specialist doctors and nurses in critical care, who may feel undercompensated in their home countries.

The neo-classical economic theory (Harris & Todaro, 1970) similarly views migration as an economic decision, motivated by wage differentials between countries. Healthcare professionals, particularly in lower-income countries, may choose to migrate to higher-income countries where their salaries and working conditions are significantly better. This economic disparity, combined with job vacancies and better healthcare infrastructure in developed nations, drives many healthcare workers to seek opportunities abroad.

In addition to economic motivations, the institutional theory (Bailey et al., 2001) highlights the role of institutions such as recruitment agencies, immigration policies, and international organizations in facilitating migration. For healthcare professionals, institutional support can lower the barriers to migration by providing legal pathways, recruitment programs, and support services. Countries with shortages in their healthcare workforce often implement policies to attract foreign professionals, making it easier for them to enter the labor market abroad.

These theoretical frameworks collectively explain why healthcare professionals may be motivated to migrate. Economic motivations, professional aspirations, institutional support, and social networks all play a role in shaping migration intentions. The combination of push factors in their home country and pull factors in the destination country creates a compelling case for many healthcare workers to seek better opportunities abroad, especially when facilitated by networks and institutional pathways.

## **2.2. Empirical evidence on migration intentions of healthcare professionals**

Empirical studies on the migration intentions of healthcare professionals reveal a variety of key factors that influence their decision to migrate, with analyses supported by diverse econometric models. From an institutional perspective, (Stilwell, 2006) studied the impact of recruitment policies on nurse migration, using a multinomial logit model to analyze destination choices. The results show that active recruitment policies in countries like the UK and Canada, which simplify access to the labor market for foreign healthcare professionals, significantly increase migration intentions towards these destinations.

(Connell, 2007) examined the mobility of healthcare professionals in Europe, using a multiple linear regression analysis. They found that bilateral policies between destination and origin countries play a key role in facilitating migration. Their study shows that bilateral agreements recognizing healthcare professionals qualifications greatly ease mobility, particularly for highly skilled nurses and doctors. (Tankwanchi et al., 2014) in their study on healthcare workers in Ethiopia, used a logistic regression model (logit) to evaluate the impact of factors such as professional experience, salary, and training opportunities on the intention to migrate. The model showed that younger professionals, especially those seeking specialization opportunities, were more likely to consider migration. This study confirms that improving professional skills, which are often limited in the home countries, is a key determinant of migration.

In their article, (Asongu, 2015) used a quantile regression approach to analyze the determinants of health-worker emigration across different points of the emigration distribution. The findings reveal that factors such as economic prosperity, health expenditure, price stability, democracy,

and corruption control exert varying influences depending on the level of emigration. Asongu concluded that uniform emigration policies are likely to be ineffective and should be adapted to the specific national contexts. Countries with higher levels of health-worker emigration require more targeted interventions, while those with better retention rates may benefit from less restrictive policies.

In their study, (Ikhurionan et al., 2022) focuses on understanding the factors driving migration, migration intentions, and non-migration among health workers from low- and middle-income countries<sup>4</sup>. The study aims to analyze the determinants that influence health workers' decisions to migrate or stay, using a combination of quantitative and qualitative research from previous studies. These factors include working conditions, salary levels, and career opportunities in destination countries. The researchers explore the motivations for migration and provide insights into the countries most affected by health worker shortages due to emigration.

In the same line, the study by (Toyin-Thomas et al., 2023) investigates the determinants of health workers migration from low- and middle-income countries through a systematic review of articles published between 1970 and 2022. Among the 107 studies analyzed, most focused on specific countries such as South Africa, India, and the Philippines, with key destination countries being the United Kingdom and the United States. The analysis primarily involved physicians and nurses. The migration drivers were categorized into two levels. At the macro level, factors like wages and security concerns were major influences on migration or the intent to migrate. At the meso level, factors such as career prospects, a favorable working environment, and job satisfaction played significant roles. These determinants have remained consistent over the past five decades, showing little variation across regions or between those who have migrated and those considering migration.

The study by (Laari et al., 2024) examines the migration intentions of nursing students in Ghana, focusing on their motivations and preferred destinations after completing their studies. Using a descriptive cross-sectional design, the research gathered data from nursing students through self-administered questionnaires. The results show that a significant portion of the students expressed a desire to migrate, primarily due to low salaries and poor working conditions in their home country. Additional factors included the lack of job opportunities and the pursuit of educational opportunities abroad. The preferred migration destinations for these

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<sup>4</sup> The World Health Organization (WHO) predicts a shortage of 18 million health workers by 2030, especially in these countries, and the continuous migration of health workers to higher-income countries exacerbates this problem.

students included Canada, the USA, the UK, and Australia. The study emphasizes the need for low-income countries like Ghana to urgently address the issue of brain drain by improving the working conditions of nurses to encourage them to remain in their home country.

### **2.3. Hypotheses**

In light of the studies reviewed in the literature, several hypotheses emerge concerning the migration intentions of healthcare professionals, based on economic, professional, and institutional factors driving these decisions. These hypotheses offer insights into the push and pull dynamics influencing the migration of healthcare workers.

Hypothesis 1: Income negatively influences the migration intentions of healthcare professionals.

Hypothesis 2: Seniority in the healthcare sector decreases the likelihood of migration.

Hypothesis 3: Healthcare professionals working in university hospitals have higher migration intentions than those in regional hospitals.

Hypothesis 4: Male healthcare professionals have lower migration intentions compared to female professionals.

### **3. Research Methodology**

From a methodological standpoint, this research adopts a positivist epistemological paradigm, based on the assumption that healthcare professionals' migration intentions can be objectively observed, measured, and explained through empirical data. The choice of a quantitative approach is motivated by the need to identify and assess the relative impact of demographic, socio-economic, professional, and institutional factors on the probability of expressing an intention to migrate. The study follows a hypothetico-deductive reasoning process: hypotheses derived from the theoretical and empirical literature are formulated and subsequently tested using survey data collected from public healthcare professionals in two public hospitals in Morocco. The use of a binary Logit model is particularly appropriate given the dichotomous nature of the dependent variable and allows for estimating migration intention probabilities while evaluating the marginal contribution of each explanatory factor. This methodological framework ensures analytical rigor and facilitates comparison with existing empirical studies on healthcare worker migration.

Building on a comprehensive review of both theoretical and empirical literature on the determinants of migration intentions among healthcare professionals, this section presents an empirical analysis in the context of Morocco. As a country facing challenges in retaining its

public healthcare workforce and with increasing global demand for healthcare professionals, Morocco provides a relevant case for examining the factors influencing migration intentions. The selection of explanatory variables and the formulation of hypotheses in this study are directly grounded in both the theoretical and empirical evidence on healthcare workers. Prior research emphasizes that migration intentions among healthcare professionals are shaped by a combination of demographic, socio-economic, professional, and institutional factors, whose relevance varies according to national and sectoral contexts (Lee, 1966; Massey et al., 1993; Stilwell et al., 2004).

In the Moroccan case, income emerges as a central explanatory variable due to persistent wage differentials between Morocco and major destination countries. Several studies focusing on Morocco highlight that relatively low remuneration in the public healthcare sector constitutes a major push factor encouraging migration intentions among doctors and nurses (Ismaili Idrissi et al., 2023; National Council for Human Rights, 2023). This empirical evidence justifies Hypothesis 1, which posits a negative relationship between income and migration intention. The income item used in the questionnaire is consistent with previous Moroccan surveys that measure earnings as a proxy for economic satisfaction and retention capacity in the public sector (Ministry of Health and Social Protection, 2023).

Seniority and length of service are included as explanatory variables to capture career-stage effects, which are particularly relevant in Morocco where promotion opportunities and professional advancement are often perceived as slow and unevenly distributed across regions. Earlier Moroccan studies show that early- and mid-career healthcare professionals are more likely to express dissatisfaction and consider migration compared to those with longer tenure (Ismaili Idrissi et al., 2023). This finding supports Hypothesis 2, according to which greater seniority reduces migration intentions. The corresponding items in the survey (graduation year and length of service) follow standard practice in migration and labor economics studies (Dustmann & Kirchkamp, 2002; Gebrekidan et al., 2023).

Gender is introduced as a demographic variable due to mixed empirical evidence regarding its effect on migration intentions. In Morocco, social norms, family responsibilities, and professional mobility constraints differ significantly between men and women, potentially influencing migration behavior. While some international studies suggest higher migration intentions among male healthcare professionals (Connell et al., 2007), recent Moroccan evidence indicates narrowing gender differences, particularly among younger cohorts (Ismaili

Idrissi et al., 2023). This contextual ambiguity motivates the inclusion of gender as a key explanatory variable and explains Hypothesis 4.

Professional status is also incorporated to account for heterogeneity within the healthcare workforce. Moroccan studies demonstrate that migration intentions vary significantly across professional categories, with nurses and general practitioners often facing fewer institutional barriers to migration compared to specialist doctors who have higher sunk training costs (Ministry of Health and Social Protection, 2023). This differentiation aligns with human capital theory and supports the inclusion of professional status as a categorical variable in the empirical model.

Finally, hospital structure constitutes a central institutional variable in this study. The Moroccan healthcare system is characterized by marked disparities between university hospital centers and regional health centers in terms of infrastructure, access to technology, training opportunities, and working conditions (Ismaili Idrissi & al., 2023). Empirical evidence from Morocco shows that professionals working in under-resourced regional facilities experience higher levels of workload, professional isolation, and dissatisfaction, which significantly increase migration intentions (National Council for Human Rights, 2023). This body of literature provides the theoretical and empirical foundation for Hypothesis 3 and justifies the inclusion of hospital structure as a core explanatory variable. The corresponding item in the questionnaire captures the institutional environment in which healthcare professionals operate, consistent with institutional and push–pull migration frameworks.

Overall, the hypotheses, explanatory variables, and survey items employed in this study are firmly rooted in both the international migration literature and empirical research specific to the Moroccan healthcare sector. This ensures conceptual coherence between theory, empirical strategy, and measurement, while enhancing the validity and policy relevance of the findings.

### **3.1. Data source**

A survey was conducted in 2022 in two hospitals with medium size but different structure: Hôpital du 20 août 1953, under the Centre Hospitalier Universitaire de Casablanca, and the Centre Régional de Santé Hôpital El Ghassani in Fès. 521 healthcare professionals (including doctors, nurses, and paramedical staff) were contacted which represent 52% of the total population of both structures (N= 1241). Only 355 have completed the questionnaires based either on face-to-face interviews or distributed through department heads. The aim of this survey was to explore the brain drain phenomenon among public-sector healthcare professionals in Morocco in order to assess migration potential and the push-pull factors that

contribute to their decisions to leave the country. Data were recorded using Google Forms and analyzed using STATA software.

### 3.2. Model Specification

The analysis of the determinants of migration intention among healthcare workers is grounded in the framework of discrete choice models. In this context, a healthcare worker's decision to migrate is viewed as a binary choice, where the individual evaluates the utility of migrating versus remaining in their current position.

Migration intention can be formalized using a latent variable model. Let  $Y_i^*$  be an unobservable (latent) variable representing the propensity of healthcare worker  $i$  to migrate. The structural equation is expressed as :

$$Y_i^* = \beta X_i + \epsilon_i$$

Where:

$X_i$ : A vector of observable characteristics (demographic, socio-economic, and institutional factors). \*  $\beta$ : A vector of unknown parameters to be estimated.

$\epsilon_i$ : The stochastic error term, representing unobserved factors influencing the decision.

Since  $Y_i^*$  is not directly observable, we observe the binary outcome  $Y_i$ , defined as:

$$Y_i = \begin{cases} 1 & \text{if } Y_i^* > 0 \text{ (Intends to migrate)} \\ 0 & \text{if } Y_i^* \leq 0 \text{ (Does not intend to migrate)} \end{cases}$$

To estimate the probability of migration intention, a specific functional form for the distribution of the error term  $\epsilon_i$  must be assumed. While both Probit (normal distribution) and Logit (logistic distribution) models typically yield similar results, this study employs the Logit model. The Logit model is preferred due to its mathematical tractability and the ease of interpreting the results through Odds Ratios (OR).

Under the assumption that  $\epsilon_i$  follows a logistic distribution, the probability that a healthcare worker intends to migrate ( $Y_i = 1$ ) is given by the cumulative distribution function (CDF):

$$P(Y_i = 1|X_i) = \frac{e^{\beta X_i}}{1 + e^{\beta X_i}} = \Lambda(\beta X_i)$$

Conversely, the probability that a healthcare worker does not intend to migrate ( $Y_i = 0$ ) is:

$$P(Y_i = 0|X_i) = 1 - \frac{e^{\beta X_i}}{1 + e^{\beta X_i}} = \frac{1}{1 + e^{\beta X_i}}$$

To linearize the relationship for estimation, we define the "odds" as the ratio of the probability of intending to migrate to the probability of not intending to migrate. Taking the natural logarithm of the odds (the logit transformation) yields:

$$\ln \left( \frac{P(Y_i = 1)}{1 - P(Y_i = 1)} \right) = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \dots + \beta_k X_{ik}$$

In this linear form,  $\beta$  represents the change in the log-odds for a one-unit increase in the explanatory variable  $X$ . For a more intuitive interpretation, the coefficients are often exponentiated ( $e^\beta$ ) to represent the Odds Ratio.

The vector  $X_i$  encompasses a multi-dimensional set of determinants identified in migration literature, categorized as follows: 1. Demographic Factors: Age and gender. 2. Socio-economic Factors: Monthly income, professional status (e.g., doctor, nurse, technician), year of graduation, and total length of service (tenure). 3. Institutional/Hospital Structure: Type of healthcare facility, working conditions, and available infrastructure.

The model allows us to test which of these factors significantly increases the likelihood ( $P_i$ ) of brain drain within the healthcare sector, providing a basis for evidence-based policy interventions.

Because the Logit model is non-linear, the coefficients ( $\beta$ ) do not directly represent the marginal effect of  $X$  on the probability  $P(Y = 1)$ . To determine the actual change in probability associated with a change in a predictor, we calculate the marginal effect at the mean (MEM) or the average marginal effect (AME):

$$\frac{\partial P(Y_i = 1)}{\partial X_{ij}} = P(Y_i = 1) \cdot [1 - P(Y_i = 1)] \cdot \beta_j$$

This further development ensures that the impact of socio-economic factors like “income” or “length of service” can be quantified in percentage point terms.

#### 4. Results and Discussion

##### 4.1. Descriptive analysis of variables

The descriptive statistics for the 355 healthcare professionals surveyed, as illustrated in Table 1, provide key insights into their demographic, socio-economic, and professional characteristics. The sample consists of 58% women and 42% men, indicating a higher female representation in the healthcare workforce. The average age of the respondents is 27 years, which shows that the majority are relatively young and at the beginning stages of their careers. The average annual income is 73606 MAD, a reflection of the earnings typical for healthcare professionals within the Moroccan public sector. Nurses form the largest occupational group, representing 49.6% of the sample, followed by resident doctors at 23.4%, specialist doctors at 9%, and generalist and internist doctors each at 2.8%. Additionally, paramedical staff account for 12.4% of the total workforce surveyed.

**Table 1:** Characteristics of variables

Variables			Description	Mean/percentage
Demographic variables	Gender	Male	It takes the value 1 if male, 0 otherwise.	42.0%
		Female	It takes the value 1 if female, 0 otherwise.	58.0%
	Age		Quantitative	27
	Income		Quantitative	73606
Socio-economic variables	Professional status	Nurse	It takes the value 1 if nurse, 0 otherwise.	49.6%
		Generalist doctor	It takes the value 1 if generalist, 0 otherwise.	2.8%
		Internist doctor	It takes the value 1 if internist, 0 otherwise.	2.8%
		Resident doctor	It takes the value 1 if resident, 0 otherwise.	23.4%
		Specialist doctor	It takes the value 1 if specialist, 0 otherwise.	0,09
		Paramedical staff	It takes the value 1 if paramedical, 0 otherwise.	12.4%
		Graduation year		Quantitative
	Length of service		Quantitative	2016
Hospital structure variable	Hospital structure	UHC	It takes the value 1 if UHC, 0 otherwise.	55.77%
		RHC	It takes the value 1 if RHC, 0 otherwise.	44.23%

Source: Author's Calculations.

Regarding educational background, the average graduation year is 2012, and the length of service for most respondents started in 2016, which means they have been in the profession for approximately six years on average.

#### 4.2. Tests of association between variables

In this section, we present the results of the association tests between several categorical variables (gender, professional status, hospital structure, etc.) and the migration intention of healthcare professionals. A chi-square test was used to determine whether there is a statistically significant relationship between these variables.

#### 4.2.1 Association between gender and migration intention

The results indicate a rejection of the null hypothesis  $H_0$ , which posits that there is no association between gender and migration intention. With a p-value of 0.008, we reject  $H_0$  and conclude that there is a significant relationship between gender and migration intention.

**Table 2:** Chi-square Test with percentages

Migration Intention	Female	Male	Total
Yes	43.20%	53.02%	47.32%
No	56.80%	46.98%	52.68%
Total	100%	100%	100%

Source: Author's Calculations.

A higher percentage of males (53.02%) express an intention to migrate compared to females (43.20%), while a larger proportion of females (56.80%) do not intend to migrate compared to males (46.98%). This suggests that men are more likely to have migration intentions, making gender an important factor in this context.

#### 4.2.2. Association between professional status and migration intention

The results show a significant relationship between professional status and migration intention, as indicated by the chi-square statistic (8.9586) and a p-value of 0.007, which is less than the 0.05 significance level. This means we reject the null hypothesis that there is no association between professional status and migration intention.

**Table 3:** Chi-square Test with percentages

Migration Intention	Nurse	General Practitioner	Medical Intern	Medical Resident	Medical Specialist	Paramedical Staff	Professor	Total
Yes	51.70%	60.00%	20.00%	38.55%	51.61%	45.45%	100.00%	47.32%
No	48.30%	40.00%	80.00%	61.45%	48.39%	54.55%	0.00%	52.68%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Source: Author's Calculations.

The data show that migration intentions vary by profession: 60% of general practitioners, 51.70% of nurses, and 51.61% of specialists intend to migrate, while only 20% of medical interns express a similar intention.

#### 4.2.3. Association between hospital structure and migration intention

The results show a significant association between hospital structure and migration intention, as indicated by the chi-square statistic (5.9294) and a p-value of 0.000, which is less than the

0.05 significance level. This means we reject the null hypothesis, suggesting that the hospital structure is significantly related to migration intention.

**Table 4:** Chi-square Test with percentages

Migration Intention	UHC	RHC	Total
Yes	44.44%	50.96%	47.32%
No	55.56%	49.04%	52.68%
Total	100%	100%	100%

Source: Author's Calculations.

A slightly higher percentage of staff from RHC (50.96%) intend to migrate compared UHC (44.44%), indicating that the hospital environment may influence professionals' decisions to migrate.

### 4.3. Summary Regression Results

The model is statistically significant (Wald  $\chi^2 = 31.800$ ,  $p < 0.000$ ), meaning the variables included significantly explain the variation in migration intentions. The pseudo- $R^2$  of 0.065 suggests that although the model explains some of the variance, there are other factors influencing migration intentions not captured by the included variables.

Statistically, the coefficient for male healthcare professionals (0.549) is significant ( $p = 0.022$ ), indicating that men are more likely to express an intention to migrate compared to women. Economically, this may reflect social and cultural norms in Morocco, where men might have more flexibility and social freedom to consider migration abroad. Men, especially in fields dominated by male doctors, may perceive better career opportunities abroad compared to the local healthcare system, where salaries are often lower and career advancement opportunities limited.

**Table 5:** Econometric regression

Intention to Migrate	Coef	Std. Err.	Z	P>z	[95% Conf. Int]
Gender					
Female	Reference modality				
Male	0.549**	0.240	2.290	0.022	0.079 - 1.019
Age	-2.097**	0.816	-2.570	0.010	-3.696 - -0.498
Age <sup>2</sup>	0.422**	0.168	2.510	0.012	0.092 - 0.752
Professional Status					

Nurse	Reference modality				
Generalist Doctor	0.103	0.712	0.140	0.885	-1.293 - 1.498
Internist Doctor	-1.929**	0.826	-2.340	0.019	-3.547 - -0.311
Resident Doctor	-0.770**	0.310	-2.480	0.013	-1.377 - -0.162
Specialist Doctor	0.151	0.441	0.340	0.732	-0.713 - 1.014
Paramedical Staff	-0.194	0.377	-0.520	0.606	-0.933 - 0.544
Length of Service	-2.444	1.667	-1.470	0.143	-5.712 - 0.823
Income	-0.369*	0.377	-0.980	0.027	-1.108 - 0.369
Graduation Year	2.709*	1.583	1.710	0.087	-0.394 - 5.812
Hospital Structure					
UHC	Reference modality				
RHC	0.322**	0.293	1.100	0.072	-0.252 - 0.895
N. observations	355				
Wald chi <sup>2</sup> (12)	31.800				
Prob > chi <sup>2</sup>	0.000***				
Pseudo R <sup>2</sup>	0.065				

(\*) significatif au seuil de 10% ; (\*\*) significatif au seuil de 5% Source : Author's Calculations.

The non-linear relationship between age and migration intentions (a negative age coefficient and a positive age<sup>2</sup> coefficient) suggests that mid-career professionals are the most likely to want to migrate. Younger professionals may still be in the career-building phase, while older professionals may be less inclined to take the risk of migrating after establishing themselves locally. In Morocco, this phenomenon may be exacerbated by stagnation in promotions or dissatisfaction among mid-career professionals regarding the working conditions in underfunded public hospitals.

The negative coefficients for internist doctors and resident doctors suggest that these professionals are less likely to intend to migrate compared to nurses, and these results are statistically significant. This could be explained by the significant investment required for specialized medical training, which encourages them to stay in Morocco to recoup this investment. Nurses, however, who make up 49.6% of the sample, face fewer barriers to migration and are often more easily recruited abroad due to the global nursing shortage.

The negative relationship between income and migration intention suggests that higher wages reduce migration intentions. This is significant because it reinforces the idea that economic incentives can play a key role in retaining healthcare professionals. In Morocco, where public-sector professionals often face low salaries and poor working conditions, increasing wages could serve as an effective policy tool to reduce brain drain. In a country where this phenomenon is concerning, particularly in the healthcare sector, improving compensation is essential for retaining talent.

The positive coefficient for graduation year suggests that younger graduates are more likely to consider migration. This may reflect dissatisfaction with the current healthcare system, especially among younger professionals who feel that their career opportunities are limited in Morocco. For younger professionals, training and specialization opportunities abroad are highly attractive. Thus, it is crucial for Morocco to invest in training programs and improve professional development opportunities to reduce this exodus.

Professionals working in Regional Health Centers (RHC) are more likely to consider migration than those working in University Hospitals (UHC). This reflects the disparity in resources and working conditions between regional and university healthcare facilities. RHC are often under-resourced and lack advanced medical technology, pushing professionals to seek better conditions abroad. Economically, this highlights the need for better resource distribution across the healthcare system to improve conditions in regional hospitals and retain staff.

### **5. Policy Recommendations**

The empirical findings of this study highlight that migration intentions among public healthcare professionals in Morocco are driven by a combination of economic, professional, and institutional factors, rather than by individual characteristics alone. In particular, the significant effects of income, career stage, gender, and hospital structure underscore the presence of structural weaknesses within the public healthcare system that heighten professionals' propensity to migrate. These results suggest that addressing healthcare workforce migration requires more than isolated policy measures and instead calls for a coordinated, evidence-based strategy that simultaneously improves remuneration, working conditions, career development opportunities, and institutional equity across regions. Building on the study's empirical evidence and informed by insights from the existing literature on health workforce mobility, the following policy recommendations aim to mitigate brain drain, enhance retention, and strengthen the long-term resilience and equity of Morocco's public healthcare system.

### **5.1. Improving Financial and Non-Financial Incentives**

The study's findings confirm that income is a statistically significant determinant of migration intentions, with lower earnings increasing the likelihood that healthcare professionals consider leaving Morocco. This result is consistent with a large body of empirical literature showing that wage differentials between origin and destination countries remain one of the most powerful drivers of healthcare worker migration (Harris & Todaro, 1970; Stilwell et al., 2004; Tankwanchi et al., 2013). Policy efforts should therefore prioritize improving financial incentives within the public healthcare system, particularly for mid-career professionals who exhibit the highest migration propensity. Beyond salary increases, non-financial incentives—such as housing allowances, transport subsidies, childcare support, and pension security—have been shown to significantly enhance retention by improving overall job satisfaction (Dieleman et al., 2009; WHO, 2010). A comprehensive incentive package combining monetary and non-monetary benefits is thus essential to counterbalance external pull factors and reduce the economic motivations for emigration.

### **5.2. Strengthening Working Conditions and Professional Environments**

The higher migration intentions observed among professionals working in regional health centers underscore the importance of working conditions and institutional quality in shaping migration decisions. Poor infrastructure, lack of medical equipment, staff shortages, and high workloads are well-documented push factors that intensify professional dissatisfaction and burnout (Connell, 2008; Toyin-Thomas et al., 2023). Improving working conditions requires sustained investment in hospital infrastructure, medical technology, and supply chains, particularly outside major urban centers. Additionally, strengthening hospital management practices—through better staffing ratios, transparent promotion systems, and participatory decision-making—can improve morale and professional commitment. Previous research shows that healthcare workers are more likely to remain in systems where they feel supported, valued, and able to deliver quality care (Dussault & Franceschini, 2006; Dieleman & Harnmeijer, 2006). Addressing these institutional deficiencies is therefore a central pillar of any effective retention strategy.

### **5.3. Targeted Policies for Regional and Underserved Areas**

The study demonstrates that healthcare professionals employed in regional health centers are more likely to express migration intentions than those working in university hospitals. This finding reflects deep territorial inequalities in resource allocation and professional opportunities within Morocco's healthcare system. International evidence suggests that generic retention

policies are often ineffective in addressing rural and regional shortages, and that targeted interventions are required (WHO, 2010). Such policies may include hardship allowances, accelerated promotion schemes, guaranteed access to specialization training, and priority transfers after a defined period of service. Importantly, compulsory service obligations should be accompanied by meaningful incentives and professional support to avoid reinforcing dissatisfaction and unintended migration outcomes (Lehmann et al., 2008). By making regional service professionally rewarding rather than punitive, policymakers can improve retention while simultaneously reducing spatial inequalities in healthcare access.

#### **5.4. Reforming Education and Career Development Pathways**

The positive association between recent graduation and migration intentions suggests that migration aspirations often emerge early in healthcare professionals' careers. This aligns with human capital theory, which views migration as an investment strategy aimed at maximizing returns to education and skills (Becker, 1962; Dustmann & Kirchkamp, 2002). To counter this dynamic, medical and paramedical education should be more closely aligned with national health system needs. Scholarship programs tied to public service commitments, structured career progression pathways, and expanded domestic specialization opportunities can reduce incentives to seek training abroad. Evidence from LMICs shows that professionals who perceive clear career trajectories and access to continuous professional development are significantly more likely to remain in the public sector (Dussault et al., 2010; Nkansah et al., 2019). Strengthening career development within Morocco is therefore essential to reducing early-stage migration intentions.

#### **5.5. Managing International Mobility**

Given the global shortage of healthcare workers and Morocco's position as a source country, migration cannot be entirely prevented and should instead be better managed. The WHO Global Code of Practice on the International Recruitment of Health Personnel emphasizes the need for ethical recruitment practices that minimize harm to source countries (WHO, 2010). Morocco could negotiate bilateral agreements with major destination countries to facilitate temporary or circular migration schemes, allowing healthcare professionals to gain international experience without permanently exiting the national system. Such agreements may also include compensation mechanisms, training partnerships, or co-financed medical education programs. Empirical evidence suggests that well-designed circular migration arrangements can mitigate brain drain while enhancing skill transfer and institutional capacity (Stark et al., 1997; Connell,

2010). Strategic international cooperation can thus transform migration from a loss into a potential development opportunity.

### **5.6. Strengthening Health Workforce Governance, Monitoring, and Evaluation**

The relatively modest explanatory power of the econometric model highlights that migration intentions are influenced by a wide range of observable and unobservable factors. This underscores the importance of strengthening health workforce governance through improved data collection, monitoring, and policy coordination. Establishing a national health workforce observatory would enable systematic tracking of migration intentions, actual departures, retention outcomes, and job satisfaction levels. Such data-driven governance is crucial for designing adaptive and evidence-based policies (Asongu, 2018; WHO, 2022). Moreover, effective retention policies require coordination across ministries responsible for health, education, finance, and labor. Regular evaluation of workforce policies can ensure that interventions remain responsive to changing labor market conditions and global migration pressures.

Overall, the study's findings indicate that migration intentions among Moroccan healthcare professionals are shaped by a complex interaction of economic incentives, career dynamics, institutional conditions, and spatial inequalities. Addressing these challenges requires a comprehensive and integrated policy approach that moves beyond isolated wage increases toward systemic reforms in working conditions, career development, regional equity, and workforce governance. Aligning national retention strategies with international best practices and empirical evidence will be critical to safeguarding Morocco's healthcare system and ensuring equitable access to health services in the long term.

## 6. Conclusion

The primary objective of this study was to identify and analyze the determinants of migration intentions among public healthcare professionals in Morocco and particularly, in a context marked by persistent workforce shortages and growing international competition for health talent. Using micro-level survey data and a binary Logit model, the study provides robust evidence that migration intentions are shaped by a combination of demographic, socio-economic, professional, and institutional factors.

The results indicate that male healthcare professionals and mid-career individuals are significantly more likely to express an intention to migrate, highlighting the role of gender norms and career-stage dynamics in migration decisions. Income emerges as a critical deterrent to migration, as higher earnings significantly reduce the likelihood of intending to migrate, confirming the importance of economic incentives in retention strategies. Furthermore, professionals working in under-resourced regional health centers exhibit higher migration intentions than those employed in university hospitals, underscoring the impact of institutional inequalities and uneven resource allocation within Morocco's healthcare system. Together, these findings reaffirm that migration intentions are not driven by a single factor but rather by the interaction of individual characteristics, career trajectories, and workplace conditions. By linking these determinants within a unified empirical framework, the study contributes to a more nuanced understanding of healthcare worker migration in low- and middle-income countries.

Despite its contributions, this study is subject to several limitations that also open avenues for future research. First, the analysis is based on migration intentions rather than observed migration behavior. While intentions are a strong predictor of actual migration, they may not always translate into realized mobility due to institutional, financial, or personal constraints. Future research could address this limitation by using longitudinal data to track healthcare professionals over time, allowing for an assessment of how intentions evolve into actual migration decisions.

Second, the study relies on a cross-sectional survey design, which limits the ability to capture dynamic changes in migration intentions across different stages of a healthcare professional's career or in response to policy reforms. Longitudinal or panel data would enable future studies to examine causal relationships more rigorously and to assess how changes in income, working conditions, or institutional environments influence migration intentions over time.

Third, the sample is drawn from two public hospital structures, which may constrain the generalization of the findings to the entire Moroccan healthcare system. Although the selected hospitals reflect important institutional differences, future research could expand the scope to include a larger and more geographically diverse set of healthcare facilities, as well as professionals working in the private sector, to provide a more comprehensive national perspective.

Finally, while the model incorporates key demographic, socio-economic, and institutional variables, it does not fully capture non-economic and psychosocial factors such as job satisfaction, professional autonomy, family considerations, or social networks abroad, which are known to influence migration decisions. Incorporating qualitative methods or mixed-method approaches in future research would allow for deeper exploration of these dimensions and provide richer insights into the complex motivations underlying healthcare worker migration.

Overall, by addressing these limitations, future research can build on the findings of this study to develop a more holistic and policy-relevant understanding of healthcare workforce mobility in Morocco and comparable contexts.

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